WE CLAIM:

1. A method for determining the suitability of a communication line for xDSL service use via single-ended analysis, comprising the steps of:

measuring characteristic parameters of at least one communication line to be tested at one end of the at least one communication line;

determining a plant map of the at least one communication line;

determining a transfer function representative of the plant map of the at least one communication line; and

analyzing the transfer function so as to qualify the at least one communication line.

2. A method according to claim 1, wherein the step of measuring characteristic parameters at one end of the at least one communication line, includes measuring the characteristic parameters at one of a CO end and a CPE end of the at least one communication line.

3. A method according to claim 1, wherein the step of measuring characteristic parameters, includes measuring at least one of a wire gauge, length and temperature of the at least one communication line.

4. A method according to claim 1, wherein the step of measuring characteristic parameters, includes testing for the presence of short circuits in the at least one communication line.

5. A method according to claim 1, wherein the step of measuring characteristic parameters, measuring a longitudinal balance of the at least one communication line.

6. A method according to claim 1, wherein the step of measuring characteristic parameters, includes testing for the presence of load coils in the at least one communication line.

7. A method according to claim 1, wherein the step of measuring characteristic parameters, includes measuring wideband noise in the at least one communication line so as to determine near-end and far-end noise levels in the at least one communication line.

8. A method according to claim 1, wherein the step of measuring characteristic parameters, includes testing loop attenuation in the at least one communication line.

9. A method according to claim 8, wherein the step of measuring characteristic parameters, includes testing loop attenuation in the at least one communication line via time domain reflectometry.

10. A method according to claim 8, wherein the step of determining a plant map of the at least one communication line includes determining the presence of characteristics and anomalies on the communication line.

11. A method according to claim 10, wherein the characteristics and anomalies include at least one of a length of the communication line, short circuits in the communication line, and damage to the communication line.

12. A method according to claim 8, wherein the step of determining a transfer function representative of the plant map of the at least one communication line includes determining the complex impedance of the communication line.

13. A method according to claim 12, wherein the step of determining a transfer function representative of the plant map of the at least one communication line further includes performing circuit modeling analysis on the plant map.

14. A method according to claim 12, wherein the step of determining a transfer function representative of the plant map of the at least one communication line further includes comparing the plant map with a bank of plant maps associated

with predetermined transfer functions.

15. A method according to claim 1, wherein the step of analyzing the transfer function so as to qualify the at least one communication line includes determining a signal-to-noise ratio and a bit rate for the communication line.

16. A method according to claim 15, wherein the step of analyzing the transfer function so as to qualify the at least one communication line further includes determining a maximum bit rate and confidence factor based on the determined bit rate and a signal-to-noise ratio for the communication line.

17. A method according to claim 1, wherein the step of measuring characteristic parameters, includes measuring wideband noise in the at least one communication line so as to determine near-end and far-end noise levels in the at least one communication line, and testing loop attenuation in the at least one communication line.

18. A method according to claim 17, wherein the step of testing loop attenuation in the at least one communication line includes using time domain reflectometry.

19. A method according to claim 17, wherein the step of determining a transfer function representative of the plant map of the at least one communication line further includes performing circuit modeling analysis on the plant map.

20. A method according to claim 17, wherein the step of determining a transfer function representative of the plant map of the at least one communication line further includes comparing the plant map with a bank of plant maps associated with predetermined transfer functions.

21. A method according to claim 1, wherein the step of analyzing the transfer function so as to qualify the at least one communication line includes determining a signal-to-noise ratio and a bit rate for the communication line

based on the wideband noise measurement and loop attenuation testing.

22. A method according to claim 15, wherein the step of analyzing the transfer function so as to qualify the at least one communication line further includes determining a maximum bit rate and confidence factor based on the determined bit rate and a signal-to-noise ratio for the communication line.

23. A system for conducting single-ended qualification of communication lines for xDSL use, comprising:

means for receiving characteristic data on at least one communication line to be tested, the receiving means being operatively connected to one of a CO end and a CPE end of the communication line; and

a controller device for analyzing the received characteristic data, the receiving means being operatively connected to the controller device wherein the characteristic data is inputted into the controller device, and the controller device includes a means for indicating whether the communication line to be tested is qualified for xDSL use.

24. A system for conducting single-ended qualification according to claim 23, wherein the means for receiving characteristic data includes at least one characteristic measuring element for receiving at least one characteristic measurement, the controller device including means for receiving and interpreting the at least one characteristic measurement.

25. A system for conducting single-ended qualification according to claim 24, wherein the controller device includes means for outputting at least one test signal via the at least one characteristic measuring element and into the communication line to be tested whereby the characteristic measuring element receives at least one return test signal derived from the outputted test signal to be inputted into the controller device for interpretation.

26. A system for conducting single-ended qualification according to claim 24, wherein the at least one characteristic measuring element receives at least one of a short circuit, load coil presence, longitudinal balance, wideband noise and

loop attenuation measurement.

27. A system for conducting single-ended qualification according to claim 23, wherein the controller device includes a data processing circuit.

28. A system for conducting single-ended qualification according to claim 26, wherein the qualifying means includes means for generating a plant map representing electrical characteristics of the communication line to be tested based on measurements received by the characteristic measuring element.

29. A system for conducting single-ended qualification according to claim 28, wherein the qualifying means includes means for determining a transfer function representing signal characteristics of the communication line to be tested based on the plant map.

30. A system for conducting single-ended qualification according to claim 29, wherein the qualifying means includes means for determining at least one of a signal-to-noise ratio characteristic and a bit rate characteristic of the communication line to be tested based on the transfer function and the wideband noise measurement.

31. A system for conducting single-ended qualification according to claim 30, wherein the qualifying means includes means for determining at least one of a maximum bit rate characteristic of the communication line to be tested based on the signal-to-noise ratio and bit rate characteristics.

32. A method according to claim 9, wherein the step of testing loop attenuation via time domain reflectometry includes generating a plurality of time domain reflectometer (TDR) traces for the at least one communication line, identifying slope changes in each of the plurality of TDR traces characteristic of at least

short and open circuit conditions in the at least one communication line, selecting from said plurality of TDR traces to eliminate TDR traces characteristic of minor anomalies in the at least one communication line, and determining impairments in the at least one communication line based on slope area characteristics of selected TDR traces.

33. A method according to claim 32, wherein the step of generating a plurality of time domain reflectometer (TDR) traces for the at least one communication line includes generating the plurality of TDR traces based on a plurality of selected line lengths and a corresponding plurality of launch pulse widths.

34. A method according to claim 9, wherein the step of testing loop attenuation via time domain reflectometry includes providing a loop simulator, generating at least one time domain reflectometer (TDR) trace simulation of a selected cable segment of the at least one communication line via the loop simulator based on an actual TDR trace representative of the at least one communication line, comparing the at least one TDR trace simulation with an actual TDR trace, and changing parameters of the at least one TDR trace simulation so as to match with the actual TDR trace.

35. A method according to claim 34, wherein the step of generating the at least one TDR trace simulation includes determining parameters for the TDR trace simulation based on the actual TDR trace of the at least one communication line.

36. A method according to claim 35, wherein the step of determining parameters for the TDR trace simulation includes determining at least one of gauge, length and termination type parameters for the TDR trace simulation based on the actual TDR trace of the at least one communication line.

37. A method according to claim 36, wherein the step of determining at least one of gauge, length and termination type parameters for the TDR trace simulation includes determining cable gauge based on backscatter characteristics of the actual TDR trace, determining cable length by calculating error differences

between the actual TDR trace and the TDR trace simulation and then determining the cable length based on the smallest error difference, and determining termination type by comparing the actual TDR trace with predetermined TDR traces of termination conditions and then selecting termination type based on the smallest error difference between the actual TDR trace and each one of the predetermined TDR traces.

38. A system for conducting single-ended qualification of communication lines for xDSL use, comprising:

a receiver operatively connected to one end of a communication line under test to receive characteristic data on the communication; and

a controller operatively connected to the receiver to analyze the received characteristic data, wherein the characteristic data is inputted into the controller and the controller is formed to indicate whether the communication line under test is qualified for xDSL use.

39. A system for conducting single-ended qualification according to claim 38, wherein the receiver includes at least one characteristic measuring element for receiving at least one characteristic measurement, the controller being formed to receive and interpret the at least one characteristic measurement.

40. A system for conducting single-ended qualification according to claim 39, wherein the controller is operatively connected to output at least one test signal via the at least one characteristic measuring element and into the communication line under test whereby the characteristic measuring element receives at least one return test signal derived from the outputted test signal to be inputted into the controller.

41. A system for conducting single-ended qualification according to claim 39, wherein the at least one characteristic measuring element receives at least one of a short circuit, load coil presence, longitudinal balance, wideband noise and loop attenuation measurement.

42. A system for conducting single-ended qualification according to claim 38,

wherein the controller includes a data processing circuit.

43. A system for conducting single-ended qualification according to claim 41, wherein the controller is operatively connected to generate a plant map representing electrical characteristics of the communication line under test based on measurements received by the characteristic measuring element.

44. A system for conducting single-ended qualification according to claim 43, wherein the controller is operatively connected to determine a transfer function representing signal characteristics of the communication line under test based on the plant map.

45. A system for conducting single-ended qualification according to claim 44, wherein the controller is operatively connected to determine at least one of a signal-to-noise ratio characteristic and a bit rate characteristic of the communication line to be tested based on the transfer function and the wideband noise measurement.

46. A system for conducting single-ended qualification according to claim 45, wherein the controller is operatively connected to determine at least one of a maximum bit rate characteristic of the communication line to be tested based on the signal-to-noise ratio and bit rate characteristics.